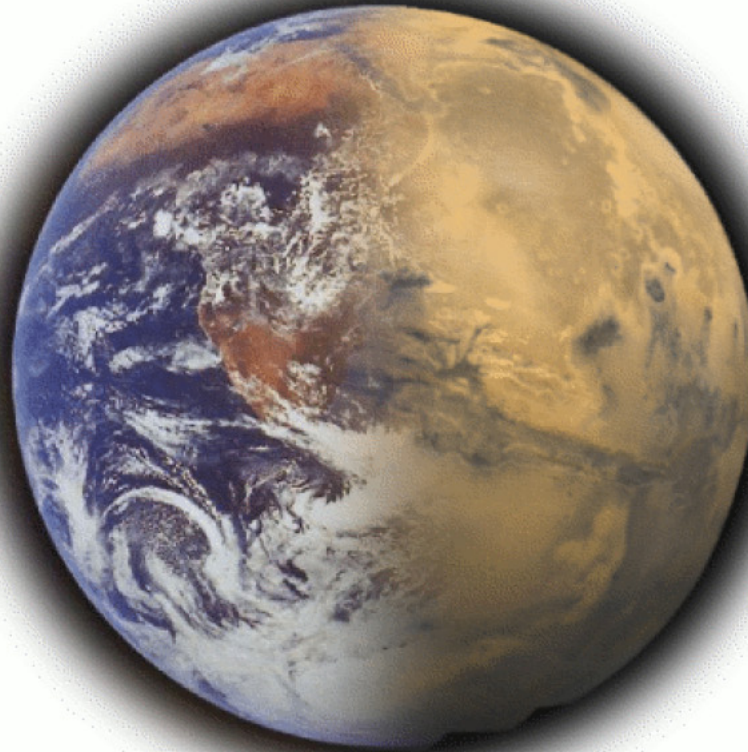


# Japan's Mars Exploration Plan



**Takashi Kubota (JAXA)**

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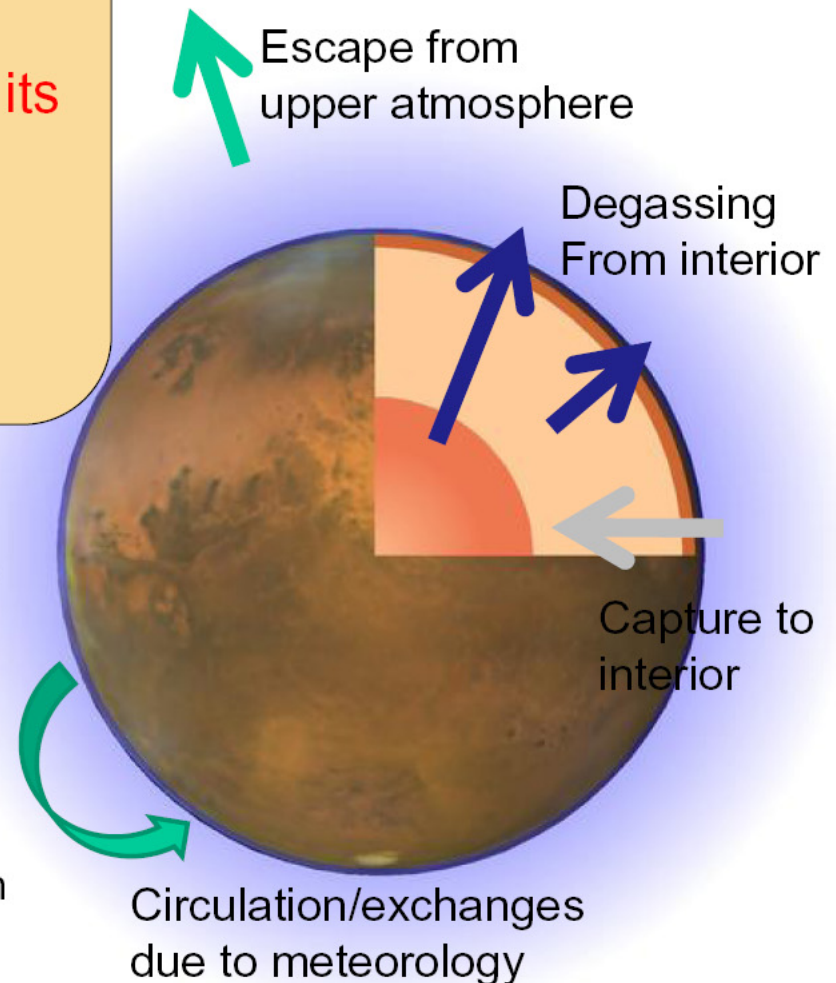
# Japan's Mars Exploration Plan

## Ultimate Goal:

To fully understand **the evolution of Martian atmosphere, the water, and its climate**. To significantly reduce uncertainties in the current models, this mission includes the following 3 science objectives.

### • Escaping Atmosphere

- Will study in detail controlling processes on removal of ions/neutrals from the upper atmosphere with special focus on the solar-wind interactions.
- Will complements 2013 *Scout* mission (TGE or MAVEN)
  - Heritage from *NOZOMI* (launched in 1998)



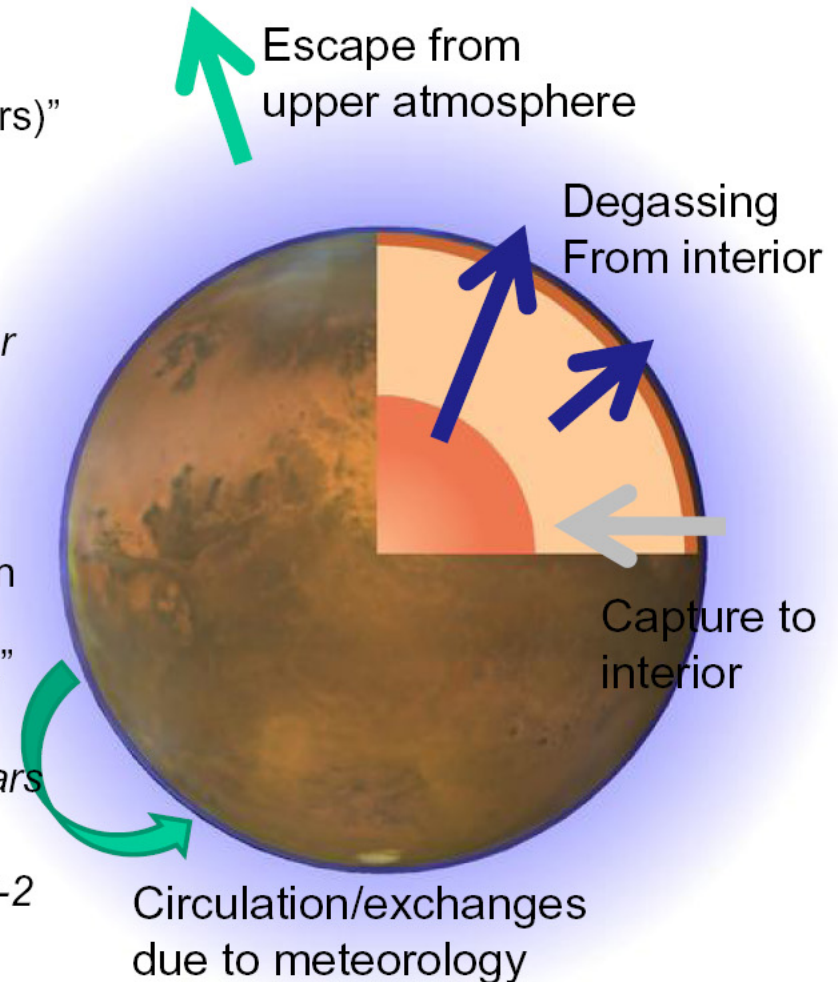
# Japan's Mars Exploration Plan

## • Meteorology

- Part of “comparative meteorology of 3 terrestrial planets (Earth, Venus and Mars)” with particular interests on water cycles
- Will complements 2018 *Mars Science Orbiter*
  - Heritage from *Venus Climate Orbiter* (launch in 2010)

## • Interior Structure

- Seismic study will improve knowledge on interior structure, contributing to understand evolution of Mars as a “solid” planet and its roles on climate history.
- Possible network science with ESA's *Mars NexT* (2018)
  - Technology developed for *SELENE-2* and earth science studies





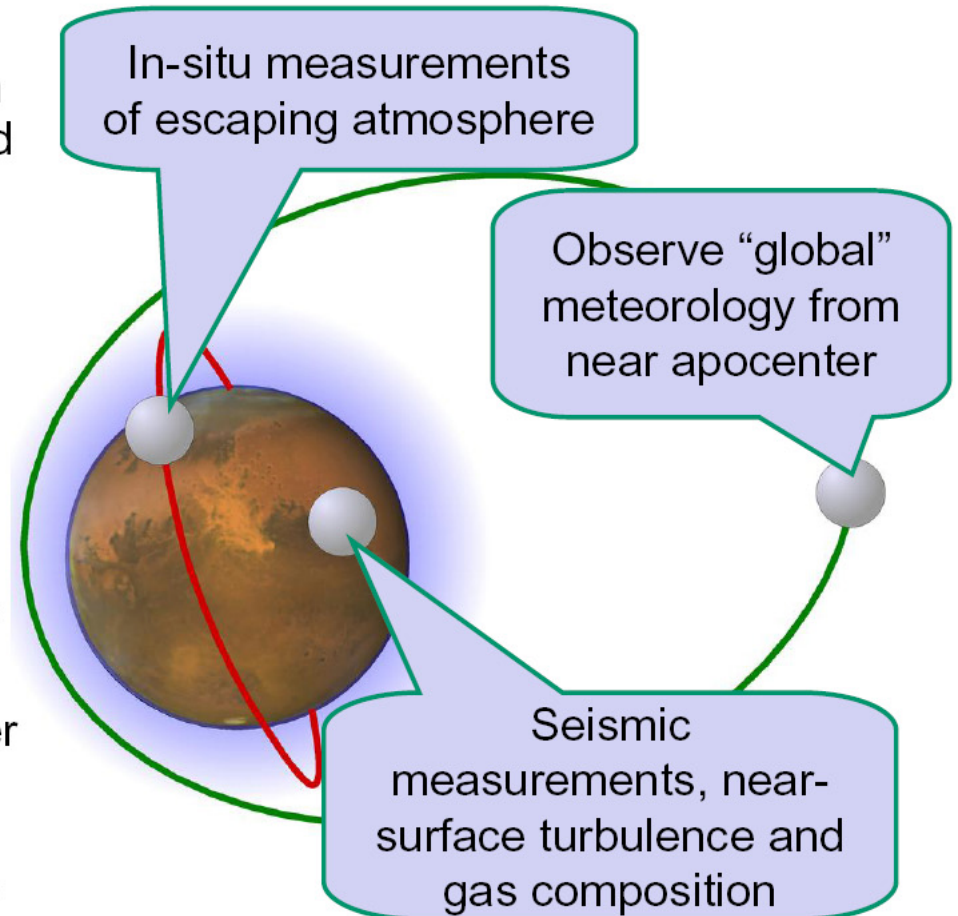
# Mars Exploration with a Lander and Orbiters

## • Orbiters

- Comparative meteorology (on a 3-axis-stabilized orbiter) and atmospheric escape studies (on a spin-stabilized orbiter)
  - Imaging cameras and a plasma science package

## • A Lander

- Seismic measurements (+ heat flux) for interior structure studies
  - Configuration of the lander & possible science packages are being discussed by researchers in the wider field



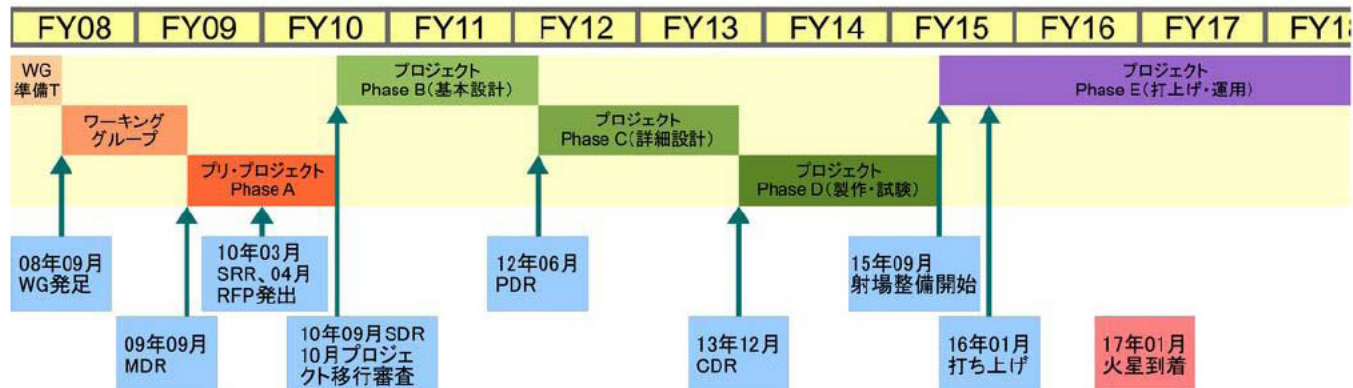
# Mars Exploration with a Lander and Orbiters

## • Technological Challenges

- Orbital controls: A lander and 2 orbiters; Separating 2 orbiters after MOI and changing their orbits as desired by the science
- Entry – descent – landing of the lander
- Tele-communications issues
- Planetary protection issues

## • Schedule

- Target launch window in 2016 or 2018
- A working group has just been formed



# “MELOS” Working Group

## • JAXA and Research Institutes

- National Institute of Information and Communications Technology
- National Astronomical Observatory of Japan
- National Institute of Environmental Studies

## • Universities

- University of Tokyo
- Aizu University
- Kobe University
- Osaka University
- Nagoya University
- Tsukuba University
- Kyoto University
- Tokyo Institute of Technology
- Tohoku University
- Tokyo Gakugei University
- Rikkyo University
- Toyama University
- Kyushu University

## • Foreign Countries

- IRF (Sweden); MPI (Germany); Caltech (USA); Cornell U (USA)

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“Lander Science” discussion meeting at ISAS/JAXA (5 Aug 2008)